Claims

1 (Canceled)

2 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

said ~~polarization layers~~ Pi being cartesian polarizers, and the normal vectors of said ~~polarization layers~~ Pi being ~~arranged in planes which are perpendicular to a common ground plane, and all said optical axes being coplanar to a said common ground plane~~ coplanar.

3 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim 2,

~~said polarizing layer vector~~ V1 ~~of P1 and said polarizing layer vector V2 of P2~~ being perpendicular to V2 ~~each other~~.

4 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim 3,

said polarizing layers P2 and P3 ~~forming~~ being part of a common ~~polarization~~ polarizing beam splitting layer with a common layer vector.

5 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31, comprising

at least one composed prism with a ~~right~~ triangular ~~prism composed of~~ base comprising two right sub-prisms T1 and T2 each with an isosceles triangular base;

the lateral surface of sub-prism T2 ~~in-between the two sub-prisms~~ facing T1 carrying a cartesian polarization layer P1;

the lateral surface of sub-prism T1, which together with a lateral surface of sub-

prism T2 forms a common lateral surface of said composed prism, carrying a cartesian polarization layer P2.

6 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31, comprising

a right prism with an isosceles triangular base;

the two lateral surfaces of equal size of said prism carrying ~~mutually complementary~~ each a polarization[[s]] layer[[s]].

7 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

comprising an additional fourth ~~polarization~~ polarizing beam splitting layer P4 which together with ~~said~~ P2 and ~~with said~~ P3 constitutes an additional complex polarizer system for congeneric polarization ~~cross-polarizer~~ according to claim ~~30~~ 31.

8 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim 7,

~~polarization layers~~ P1 and P4 ~~having parallel polarizing layer vectors and~~ being coplanar and having a common layer vector, and ~~the polarization layers~~ P2 and P3 ~~having parallel polarizing layer vectors and~~ being coplanar and having a common layer vector~~, and all four layers having an intersection line~~.

9 (Withdrawn): Complex polarizer system for reciprocal polarization (cross-polarizer) comprising

at least two polarizing layers Pi (i=1,2,..);

said Pi characterized by a normal vector Ni normal to Pi and a polarizing layer vector Vi coplanar to Pi;

said Pi having beam splitting properties, which split an incident beam into a transmitting and a reflected beam;

said Vi and the reflected beam spanning the plane of polarization of the reflected beam;

said Vi and the transmitting beam spanning a plane perpendicular to the plane of polarization of the transmitting beam;

P1 and a further polarizer being arranged along a first optical path S1 such that the plane E1 is spanned by V1 and the optical axis of S1 in P1, and the plane E2 is spanned by the polarizing layer vector of said further polarizer and the optical axis of S1 in said further polarizer;

said two polarizing layers being mutual complementary, characterized by

the plane E1*, derived from E1 by optional means for folding, being perpendicular to E2;

P1 and a further polarizer being arranged along a second optical path S2 such that the plane E3 is spanned by V1 and the optical axis of S2 in P1, and a plane E4 is spanned by the polarizing layer vector of said further polarizer and the optical axis of S2 in said further polarizer;

said two polarizing layers being mutual complementary, characterized by the plane E3*, derived from E3 by optional means for folding, being perpendicular to E4;

said two optical paths S1 and S2 intersecting in P1 with equal cutting angles between N1 and S1 and between N1 and S2;

the architecture of the system coupling the transmission at P1 to a reflection at the further polarizer along S1 and the corresponding reflection at P1 to a transmission at the further polarizer along S2.

10 (Withdrawn): Complex polarizer system for reciprocal polarization (cross-polarizer) comprising

at least three polarizing layers Pi (i=1,2,3,..);

said Pi characterized by a normal vector Ni normal to Pi and a polarizing layer vector Vi coplanar to Pi;

said Pi having beam splitting properties, which split an incident beam into a transmitting and a reflected beam;

said Vi and the reflected beam spanning the plane of polarization of the reflected beam;

said Vi and the transmitting beam spanning a plane perpendicular to the plane of polarization of the transmitting beam;

P1 and P2 being arranged along a first optical path S1 such that the plane E1 is spanned by V1 and the optical axis of S1 in P1, and the plane E2 is spanned by V2 and the optical axis of S1 in P2;

said polarizing layers P1 and P2 being mutual complementary, characterized by the plane E1*, derived from E1 by optional means for folding, being perpendicular to E2;

P1 and P3 being arranged along a second optical path S2 such that the plane E3 is-spanned by V1 and the optical axis of S2 in P1, and a plane E4 is spanned by V3 and the optical axis of S2 in P3;

said polarizing layers P1 and P3 being mutual complementary, characterized by the plane E3*, derived from E3 by optional means for folding, being perpendicular to E4;

said two optical paths S1 and S2 intersecting in P1 with equal cutting angles between N1 and S1 and between N1 and S2;

the architecture of the system coupling the transmission at P1 along S1 to a reflection at P2 and the corresponding reflection at P1 to a transmission at P3 along S2.

11 (Withdrawn): Complex polarizer system for reciprocal polarization (cross-

polarizer) according to claim 10,

comprising an additional fourth polarizing layer P4, which together with said P2 along a third optical path S3 and together with said P3 along a fourth optical path S4 constitutes an additional cross-polarizer according to claim 10.

12 (Canceled)

13 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

all of said Pi being cartesian polarizers~~, e.g. wire grid polarizers~~.

14 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

all of said Pi being thin-film polarizers of the MacNeille type.

15 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

all of said Pi being contained in a body ~~and the optical paths into and out of the cross-polarizing system being made possible by~~ with windows or openings.

16 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31, further comprising

at least two spatial light modulators;

said complex polarizer system being used to feed the spatial light modulators with polarized light.

17 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31, further comprising

at least two spatial light modulators;

said complex polarizer system being used to superpose the modulated light from the spatial light modulators.

18 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31, further comprising at least two spatial light modulators of the type micro-electro-mechanical-system (MEMS);

said complex polarizer system being used to feed the spatial light modulators with polarized light and to superpose the modulated light from the spatial light modulators.

19 (Withdrawn): Complex polarizer system for reciprocal polarization (cross-polarizer) according to claim 9, further comprising at least one spatial light modulator positioned in said optical paths S1 and S2 between P1 and P2.

20 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim 15, further comprising at least one spatial light modulator which is mounted to the body.

21 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

comprising at least one right triangular prism;

said prism being a compound prism composed of two right triangular sub-prisms with the base of an isosceles triangle each, with a thin-film type ~~polarizing layer P1 with its layer vector V1~~ being situated between these two sub-prisms;

the lateral surface of the compound prism which consists of two lateral surfaces of the sub-prisms carrying a cartesian type ~~polarizing layer P2 with its layer~~

~~vector V2~~;

V2 being perpendicular to V1.

22 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

comprising at least one right triangular prism;

said prism being a compound prism composed of two right triangular sub-prisms with the base of an isosceles triangle each, with a cartesian type ~~polarizing layer~~ P1 ~~with its layer vector V1~~ being situated between these two sub-prisms;

the lateral surface of the compound prism which consists of two lateral surfaces of the sub-prisms carrying a cartesian type ~~polarizing layer~~ P2 ~~with its layer vector V2~~.

23 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

comprising at least one right triangular prism;

said prism being a compound prism composed of two right triangular sub-prisms T1a, T1b with the base of an isosceles triangle each;

those lateral surfaces of the compound prism, which consist of only one lateral surface of the sub-prisms carrying ~~polarization layers~~ P1 and P2.

24 (Currently amended): Complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31,

comprising at least one right triangular prism;

said prism being composed of two right sub-prisms with the base of an isosceles triangle each;

a thin-film type ~~polarizing layer~~ P1 being situated between these two sub-prisms.

25 (Canceled)

26 (Currently amended): Method of using a complex polarizer system ~~for reciprocal polarization (cross-polarizer)~~ according to claim ~~30~~ 31.

27 (Withdrawn): Method for reciprocal polarization (cross-polarization),

using a light source;

using three polarization beam splitting layers $P_{trans1ref1}$, with a polarizing layer vector $V_{trans1ref1}$, P_{ref2}, with a polarizing layer vector V_{ref2}, and P_{trans2}, with a polarizing layer vector V_{trans2};

using the optical axis A_{trans1} and the optical axis A_{ref1} which is derived from A_{trans1} by mirroring A_{trans1} at the plane of $P_{trans1ref1}$;

using a polarized beam $B_{trans1ref2}$, which transmits $P_{trans1ref1}$ along A_{trans1};

using a polarized beam $B_{ref1trans2}$, which is reflected at $P_{trans1ref1}$ along A_{ref1};

arranging $B_{trans1ref2}$ and $B_{ref1trans2}$ such that they form a common beam with both polarization components of $B_{trans1ref2}$ and $B_{ref1trans2}$ on one side of $P_{trans1-ref1}$;

choosing $V_{trans1ref1}$ such that the plane of polarization of $B_{trans1ref2}$ is perpendicular to the plane spanned by $V_{trans1ref1}$ and A_{trans1}, and that the plane of polarization of $B_{ref1trans2}$ is spanned by A_{ref1} and $V_{trans1ref1}$;

guiding $B_{trans1ref2}$ on an optical path between $P_{trans1ref1}$ and P_{ref2};

arranging P_{ref2} such that the optical path of $B_{trans1ref2}$ leads to P_{ref2} in the optical axis A_{ref2};

arranging P_{ref2} such that $B_{trans1ref2}$ is reflected at P_{ref2} by choosing V_{ref2} such that the plane of polarization of $B_{trans1ref2}$ is spanned by A_{ref2} and V_{ref2}, therefore coupling the transmission of $B_{trans1ref2}$ at $P_{trans1ref1}$ to a reflection of $B_{trans1ref2}$ at P_{ref2};

guiding $B_{ref1trans2}$ on an optical path between $P_{trans1ref1}$ and P_{trans2};

arranging P_{trans2} such that the optical path of $B_{ref1trans2}$ leads to P_{trans2} in the optical axis A_{trans2};

arranging P_{trans2} such that $B_{ref1trans2}$ transmits P_{trans2} by choosing V_{trans2} such that the plane of polarization of $B_{ref1trans2}$ is perpendicular to the plane spanned by A_{trans2} and V_{trans2}, therefore coupling the reflection of $B_{ref1trans2}$ at $P_{trans1ref1}$ to a transmission of $B_{ref1trans2}$ at P_{trans2}.

28 (Withdrawn): Method for reciprocal polarization (cross-polarization),

using a light source;

using four polarization beam splitting subprocesses (either a polarizing transmission or a polarizing reflection at a polarizing beam splitting layer) P_{trans1}, P_{ref1}, P_{ref2}, P_{trans2};

using a polarized beam $B_{trans1ref2}$, transmitting at the process P_{trans1};

using a polarized beam $B_{ref1trans2}$, which is reflected at P_{ref1};

said P_{trans1} and P_{ref1} subprocesses being the polarizing transmission subprocess and polarizing reflection subprocess of a common polarization split process;

sending $B_{trans1ref2}$ through the polarizing reflection subprocess P_{ref2}, thus coupling the polarizing transmission P_{trans1} of $B_{trans1ref2}$ to the polarizing reflection P_{ref2} of $B_{trans1ref2}$;

sending $B_{ref1trans2}$ through the polarizing transmission subprocess P_{trans2}, thus coupling the polarizing reflection P_{ref1} of $B_{ref1trans2}$ to the polarizing transmission P_{trans2} of $B_{ref1trans2}$.

29 (Canceled)

30 (Canceled)

31 (New) Complex polarizer system,

comprising an arrangement of three polarizing beam splitting layers Pi, wherein Pi= P1, P2, P3;

each Pi being characterized by its layer vector Vi, wherein Vi = V1, V2, V3, whereas Vi is defined to be coplanar to Pi and is defined such that a linearly polarized light beam propagating towards Pi along an optical axis A is reflected at Pi if its plane of polarization is equal to the plane spanned by A and Vi;

said polarizing beam splitting layer P1 being configured to split an unpolarized light beam propagating along axis A1 into a linearly polarized light beam transmitting P1, and a linearly polarized light beam which is reflected by P1 into the axis A2;

said polarizing beam splitting layer P2 being arranged along A1 such that A1 and V2 span a plane which is normal to the plane spanned by A1 and V1;

P2 and P1 therefore being configured as a polarizing beam splitting system wherein a linearly polarized beam which transmits P1 along A1 is reflected at P2;

said polarizing beam splitting layer P3 being arranged along A2 such that A2 and V3 span a plane which is normal to the plane spanned by A2 and V1;

P3 and P1 therefore being configured as a polarizing beam splitting system wherein a linearly polarized beam which is reflected at P1 into A2 transmits P3.

32 (New): Complex polarizer system according to claim 31,

comprising at least one right triangular prism;

at least one lateral surface of said prism carrying a polarizing beam splitting layer Pi.

33 (New): Complex polarizer system according to claim 32,

two lateral surfaces of said prism carrying polarizing beam splitting layers.

34 (New): Complex polarizer system according to claim 8,

P1 and P4 being polarizing beam splitting layers of the thin-film type;

P2 and P3 being polarizing beam splitting layers of the cartesian type.

35 (New): Complex polarizer system according to claim 31,

all of said Pi being wire grid polarizers.

Hagelstadt, Sept. 20th